raphy. Nevertheless, during his frequent absences, unorthodox views have crept into his clinic and even into the textbook of Young and Davis. However, this last is meaningless, as the writing of this paper was suggested by a conversation with Professor Young last summer.

My impression is that in practically all of the large eastern clinics double pyelograms are routinely done and the same is true in Chicago, hence I am surprised to find that in Los Angeles they do single pyelograms and subject the patient to a double session of kidney colic, hospital expenses, et cetera. Any patient that has both kidneys lavaged with 1 per cent silver nitrate, or with 3 per cent mercurochrome, and then has the catheters plugged for ten minutes can tolerate the lavage with 12 per cent sodium iodid (under eighteen inches of gravity pressure) long enough for an x-ray exposure. Furthermore, if 10 cc. of 20 per cent sodium iodid can be injected into his veins for syphilis, his system will not resent a little leakage of 12 per cent sodium iodid between the renal tubules (Fig. 7), beneath the capsule (Fig. 1), beneath the pelvic fascia (*Radiol.*, 1928, x, p. 434, Figs. 6 and 7), or through the renal parenchyma (*Ann. Surg.*, 1926, lxxxv, p. 253, Fig. 3, February, 1926).

Emphasis should be laid upon the point brought out by both Doctors Reinle and Manson that although double pyelography is desirable there are no hard and fast rules, and that every case should be considered individually and so treated.

INTESTINAL PROTOZOA*

THEIR RELATION TO CERTAIN DISEASES—DIAGNOSIS AND TREATMENT

By JOHN V. BARROW, M. D.
Los Angeles

DISCUSSION *by Herbert Gunn, M. D., San Francisco; Q. O. Gilbert, M. D., Oakland.*

THIS paper will deal briefly with the essentials in laboratory diagnosis. It will discuss the clinical syndromes probably related to the presence of human intestinal protozoa. The treatment in its concrete form will give a résumé of the various drugs, diets, and other means at our disposal for combating these infestations.

The literature of several years ago dismissed as commensals all intestinal protozoa not proven able to penetrate the bowel wall. This unscientific attitude practically prohibited further study or investigation of this problem, and left at once only the *Amoeba histolytica* and the ciliated *Balantidium coli* in the pathogenic group. At this time the allergic reaction of foreign proteins in disease was not being considered. Such reactions as Pottenger points out in tuberculosis, Wertheim in syphilis, and the reactions of intestinal proteins in producing various forms of urticarias, all tend to prove the importance of foreign protein within any part of the digestive tube. The above biochemical reactions would indicate the absorption of substances which, either without further synthesis or without detoxication, account for this physiological depressive behavior. The term *depressive* is not used in the psychological sense. Clinically, depression seems to be brought about by two great forces: first, by the supply to the organ or tissue of an unusable or poisonous protein, and second, by the failure to supply to the organ or tissue some important component part, the lack of which (vitamin) produces a deficiency disease.

LITERATURE

We have reviewed practically every significant work on the diagnosis and treatment of protozoa. Cytological authorities are few. One need not remember more than a dozen names to be familiar with those who are and who have been capable of settling a cytological dispute. For the encouragement of the clinician and his technical laboratory workers, technicians of the entire world have acquired their diagnostic standards from not more than half a dozen masters in cytology. These few authorities do not differ in the great essentials; a new species is occasionally a matter of question. We have passed the period when the first seeing of an organism by a novice is sufficient authority for a new name. The *Amoeba dysenteriae* had received seventy-five christenings from various parts of the world before Schaudinn gave it the most popular name of *Amoeba histolytica*. This would seem a discouraging outlook for a critical diagnosis, but when we reflect that it took but few men to work out bacteriological accuracy, and not a tremendous number to set the standards for medical practice, we can readily appreciate that it is as easy to follow and duplicate the work of masters in protozoölogy as it has been in fields of medical science and art.

The author wishes, therefore, to call your attention to the memorable monographs of Sellards and Walker which occurred in that formative period around 1909 to 1914, and again to the present-day standard bearers, Dr. Charles A. Kofoid of the University of California and Dr. Clifford Dobell of London. There are other workers deserving of full mention whose monographs and diagnostic works as well as those of other authorities can be had in most medical libraries throughout the world and can be obtained from any active medical book dealer.[1]

ESSENTIALS IN LABORATORY DIAGNOSIS

Doctor Kofoid has raised the very vital problem of the differentiation of protozoan from metazoan cells. We are obliged to leave this solution to cytological experts. Our serious duty is to tabulate careful observations and to submit an abundance of pathological material for research and study. Mistaken diagnoses are not so disastrous clinically as to render diagnosticians silent. Let each worker remember that the illustrations of typical organisms and cysts were probably chosen from among thousands of atypical ones purposely omitted. The completed cyst, true to racial type, is often difficult to find, but one or two essential characteristics of the organism will be found more or less prominent in every specimen. Treatment must not be so dangerous that an occasional mis-

* Read before the General Medicine Section of the California Medical Association at its Fifty-Seventh Annual Session, April 30 to May 3, 1928.

1. Textbooks are not mentioned, in order to avoid controversy as to authorities.

Dobell's "Human Intestinal Protozoa" and Kofoid's "Amoeba in Man" should be in every laboratory.

The Archives of Internal Medicine of April 15, 1928, page 560, is worthy of perusal by all.

taken diagnosis can result in harm to our patient. There is so much that is beneficial in the hygienic and physiologic management of these cases that a wrong diagnosis and subsequent treatment may prove beneficial rather than harmful to both the patient and the empiricist.

The virulence of an infection is measured clinically by the effect it produces. Its ability to stir up local or general reaction calls our attention to the invader. Both the quantity and the quality of the toxin play their parts against the resistance and weakness of the host. If the entrance of a toxin into tissues does not allergically stimulate antibodies or protective substances, the host or some part or organ thereof must suffer in vitality. This deficiency is probably subjectively revealed by depression.

Poisonous substances circulated to our endocrine glands tend to lower their function. Failure of glandular function means a lack of all vitamin benefit and the system is soon in a deficiency state—which is the alpha and omega of several of our chronic diseases. By the above reasoning we can understand some of our failures in preventive medicine. Inability to cultivate protozoa or to experiment either physiologically or chemically with their cellular components is as great a handicap as not being able to measure the virulence or foreign protein load in these severe intestinal protozoan infections.

We are therefore forced to utilize the methods of our forefathers. We must observe and, without prejudice or error, set down what we see as facts. When certain clinical findings constantly group themselves about a type of disorder, they constitute a syndrome. Patients heavily and chronically infested with intestinal protozoa present such a constant and unerring set of symptoms, and in the absence of experimental proof we must recognize this syndrome.

INFESTATION—WITH INTESTINAL DISTURBANCE

The first clinical sign in these patients is some form of intestinal disturbance, which renders him superconscious of his digestive tract, its movements, or lack thereof. These signs are gas, tenderness, cramps, dizziness, constipation, diarrhea, forgetfulness, and lack of concentration, no interest in life, asthenia of thought, desire and action, together with various complaints of indigestion not substantiated seemingly by fact or physiology. The above condition comes on insidiously, and when the true complaint reaches the physician there is present the metabolic imbalance, the deficiency in vitamin, endocrine dysfunction, and malaise to the point of melancholy. There are aches and pains referable to no anatomical, physiological or psychological causation. Without appetite for food or hope for the future, the patient presents his bewildered "complex" to his often perplexed physician.

BLOOD PICTURE

The laboratory emphasizes the picture of chronic deficiency by showing a lowering of the hemaglobin and red and white blood cells. In the latter the polynuclear or bone-marrow cell suffers most. The eosinophile and the neutrophile leukocyte share this depression. Most textbooks state the contrary, perhaps because authors do not check every quoted statement but copy largely from previous publications, thereby perpetuating medical mistakes. During the acute invasive stage of protozoan infestations polynuclear production is probably stimulated as shown by counts taken at the height of the systemic reaction. Chronic infestation depresses the polynuclear blood-forming organs, as does influenza and typhoid fever. Both eosinophil and neutrophil share this depression, which may be the result of foreign protein poisoning, or the expression of a general metabolic deficiency. Whatever the cause, there is certainly not an eosinophilia.

The above facts must be remembered when the diagnosis or the determination of the need for surgical intervention concerns the appendix, or other abdominal viscera in a protozoan case. The laboratory will further show a deficiency in the body calcium, lost through the feces in the form of fatty acid crystals. No work has ever been done on the chemistry of this interesting physiological behavior.

The above facts and findings are closely associated and are demonstrable almost constantly in chronic metabolic and deficiency diseases, including the severe anemias, diseases of the blood-forming organs, chronic deforming arthritis of Ely's type 2, and the so-called avitaminoses, neurasthenias, etc.

PROTOZOAN CARRIERS

The protozoan carrier is in the same status pathogenically as the carrier of diphtheria, typhoid, tuberculosis, syphilis, gonorrhea, leprosy, or any other pathogenic possibility. He should neither be neglected and too little treatment given, nor be abused by overtreatment. He should receive care and instruction both as an individual and as a potential pathogenic menace to his community.

GENERAL TREATMENT

Before discussing medicinal treatment it is well to observe that there is no specific diet, climate, temperature, mountain spring, or desert pool to be curatively recommended. Change from one climate to another may prove of lasting benefit. This change may also work in the opposite way, and carriers, who have no knowledge or ill effect from the infestation, may have an exacerbation of the disease, even to the acute form. One finds the infestation present in the asthenic type of patient most often. The heavily infested, chronically, are those most in need of total vitamins and could often be classified as hypoadrenia or avitaminosis cases. Nowhere in medicine is common sense against harsh treatment better directed than in these chronic cases. Good hygienic surroundings with general nourishing food is the most needed. They often have spent money enough on diet lists and starvation advice from cultists to have carried them through their illness comfortably. Many of these chronic cases have been seeking health for

years and naturally fall a prey to all types of charlatans.

All acute cases must have rest in bed, sufficient fluids, bland nutrition, and general systemic support. Milk and gruel mixtures are the fundamental basis of the diet and must be continued entirely through the acute irritative stage. As the chronic stage approaches, soft solids, adequate in nutrition, vitamin, and bulk, must be supplied for proper physiological function. A diet to cure a chronic colitis would often kill the patient by sheer lack of nutrition and vitamins.

The hygienic protection of others must not be omitted. With our modern system of bathroom sanitation, and personal cleanliness, there is little danger to others. The unclean food handler within the city and the unhygienic toilet arrangements of vacation camps probably constitute our greatest menace. Prophylaxis in general is covered by our fight against flies, unclean hands of food handlers, filthy fertilization of vegetable-growing soils, improper disinfection and disposal of excreta in country places. Neglect of proper precautions favor an unsafe water and vegetable supply through human contamination. It is almost a repetition of the hygienic fight against typhoid fever, and the danger to the public is less easily prevented because cysts of protozoa are more resistant than the organisms of typhoid.

MEDICAL TREATMENT

The action of drugs employed is similar in acute and chronic cases and their complications. What is said of their method of administration applies equally to all of these conditions. Chronic protozoan infection may not always require treatment, and such should not be administered when the treatment would mitigate against the recovery from some other unrelated disease as pneumonia. However, in many cases the treatment for chronic protozoa possesses so much of alterative benefit that much help is received even in unrelated diseases. As a concrete example it has been shown on the author's service in the General Hospital that, although protozoa are exceedingly rare in typhoid fever patients, the use of emetin is of great benefit in its treatment.

With the discussion of each drug we shall include its toxicity. Reasonably brief directions for its administration together with the specific and alterative action of each remedial agent will be given. Although discussed separately, two or more remedies must often be used simultaneously as is our medical custom.

Ipecac and *its derivatives* deserves first place in the treatment of protozoan diseases. Their alterative action in liver, lung, and intestinal disorders, has long been known. This principle depends on mild, not massive, doses. To clinicians who master its use, ipecac becomes a sort of vegetable iodid, seemingly capable of favorable influence on all diseases metabolic in character. It produces a mild hyperemia of the intestinal mucosa. Probably the same action is present in all mucous surfaces. In one form or another it is probably detrimental to all protozoa. It is particularly harmful to the *Amoeba dysenteriae*. In excessive doses both ipecac and its active alkaloid exert a powerful depressive action on all cellular structures, expressed particularly in muscle and nerve weakness. Both experiment and experience have placed the rational and reasonable dose of emetin at one-third of a grain. The unpublished records of the author's cases electrocardiographed in the General Hospital by Doctors Berman and Leake failed to show any cardiac variation during or following the intravenous administration of one-third to a grain in the human. However, the dosage on guinea-pigs can easily be pushed to cardiac depression. Protozoan toxin seems to produce the same depression. In patients who already have a very low adrenal and general endocrine dysfunction, emetin may easily be given to the point of danger, and in such patients must be either very guardedly given or withheld completely.

We find the large dosage of from one to three grains of *emetin* recommended and copied from one author to another. This dangerous dose is probably responsible for tragedies in the practice of physicians who must on first administration of a drug follow texts rightfully considered sane, safe, and sound. It is regrettable that systems of medical texts give only a mild caution against such tremendous overdosage. Such overdosage will certainly bring into disrepute a drug which deserves a place with mercury, iodin, and arsenic in their favorable or alterative action in disease. In the endocrine depression it is a mooted question whether all depressive or cellular destructive therapy would not better be discarded and dependence placed on all the factors of hygiene, diet and environment that will build up the body resistance. These hypoadrenia cases are easily injured if not fatally terminated by excessive toxic therapy. In at least two texts we find recommended from ninety to one hundred grains of emetin in a comparatively short course of treatment. Since one grain of emetin is the alkaloid from ninety grains of ipecac, we readily compute that the advised total dosage in this brief treatment ranges from eight thousand to almost eleven thousand grains of ipecac. Such dosage is manifestly preposterous. I am sure we see cases where the administration of one-sixth to one-third grain daily is as spectacular in its benefits as any we could expect or hope for by large dosage.

Rarely does any other complication than mild nausea or muscle tiredness result from the proper use of ipecac and its derivatives. Individual drug idiosyncrasy must, however, be borne in mind.

Oral administration of *ipecac* is by the powdered drug in pill or capsule form, and by the alkaloidal salts of bismuth iodid and its competitor, emetin peroxid. All of these must be enteric (salol or keratin) coated to prevent stomach digestion and consequent severe vomiting. In this form the drug is given in large dosage and special care is necessary in both the selection of cases and in the technique of administration. The large dose is given usually late at night following complete rest. It may be preceded, in the highly nervous patient, by paregoric or even by morphin hypodermically. After a day of light, nonresidue,

nutritious diet, at eleven p. m. the patient is given from six to twelve of the five grain pills and left in complete quiet with an ice bag to the epigastrium, and all the natural inducements for sleep. If nausea should develop renew the ice bag and add an ice collar to the neck. Breakfast, if desired, may consist of some hot coffee, or toast and tea, or grapefruit may be gratefully received. Provide well for body fluids. The noon and early evening meals may be chosen by the patient from a light, nonresidue menu. Each succeeding night the dosage is reduced by five grains until the daily dosage of five grains is reached, which may be maintained for ten to fifteeen days. The length of the course depends on the reaction of the patient and the results obtained. The above treatment is drastic and should not be administered to patients who have cardiac or other severe asthenia or deficiency where marked nausea or purging might induce collapse. If any sign of muscle weakness supervenes, the treatment must be stopped, during any stage, until all untoward symptoms are gone. Then perhaps some other form of therapy should be substituted. The above caution applies to all ipecac derivatives, no matter how administered.

Emetin hydrochlorid is the most serviceable of all the ipecac preparations. The earliest dosage was placed at one-third grain hypodermically or intravenously. The first dose in the acute cases should be given hypodermically. In very acute and robust patients it may be given twice daily, but extreme caution should be used in giving larger doses. There is an ordinary red area about the size of a half-dollar at the point of injection on the following day, whether given subcutaneously or intramuscularly. Frequently the reaction is severe enough to cause a slight erythema studded with a few blisters. This is not an infection and disappears in two or three days with no other treatment than cleanliness. Acute cases should have the one-third grain dose daily intravenously for about ten days or two weeks, inquiry being made daily as to the appearance of weakness from the drug. At the end of two weeks the injection is given on alternate days or twice weekly for another two or three weeks. During the following month or six weeks one-third grain weekly will probably be sufficient. After this a period of rest from emetin should be given for four weeks or even longer. Coincident with this injection may be used the stovarsol, chaparro amargosa, or even one of the other ipecac preparations. The statement still abounds in the literature that one-half dozen doses of emetin are sufficient to rid the patient of cysts. This contention is comparable to removing freckles by sending a small red-headed boy out of the room. Chronic patients may be up and about so far as the treatment is concerned, but patients with acute dysentery belong in bed always.

Emetin bismuth iodid is given best at late bedtime in doses of three grains, with the same caution as above. The periodid in one grain capsules is a competitor of the bismuth salt and is administered in a like manner. Both preparations owe their efficacy to emetin and not to iodin. The course of these preparations is from six to twelve days. If signs of weakness or heart disturbance occur, the course should end and some other form of therapy should be substituted.

Alcresta ipecac tablets, two every two hours or two t. i. d. are very helpful in chronic cases. The calcresta capsules, containing also some calcium phosphate, one t. i. d., a. c., are very valuable in the patients who have a tendency to chronic constipation and liver sluggishness. Their action on the liver function is excellent and their action chronically is alterative.

The fluid extract of *ipecac* in doses of thirty to one hundred twenty minims in four ounces of water, administered by the duodenal tube is recommended only in hospital and well-nourished patients.

Several *arsenical* preparations have been used but, to avoid confusion, we shall mention only two, viz., *neoarsphenamin* and *stovarsol.* Both preparations have their competitors. Neoarsphenamin in usual dosage may be given in six ounces of water as a duodenal or rectal lavage, or intravenously as usually administered, and with the usual precautions. Intravenously it seems more of an alterative than a protozoacide.

Stovarsol in four-grain tablets taken one to four daily is very effective in many of the acute dysentery cases. It is a well-suited treatment for *giardia* and probably is quite as effective for *chilomastix* infection. Its use entails much caution against arsenical poisoning expressed often early by itching, dermatitis, and an exacerbation of intestinal symptoms. Asthenic cases with dietary idiosyncrasies are most prone to go wrong under this management. The drug must be administered over short periods only, and then cautiously watched daily.

Bismuth subnitrate in teaspoonful doses every two to four hours for days, and even weeks, is strongly recommended by some authors. This treatment is accompanied with a milk diet for weeks. Caution is necessary in cases of mechanically faulty bowels, for the powder may form solid masses difficult or even impossible of expulsion. Manual removal of caked bismuth from the rectum is often necessary.

We cannot agree that Epsom salts or even castor oil have a safe place in severe dysentery.

For years a substance known in Europe as *yatren* and in America as *anayodin* has had considerable mention, more favorable in Germany than elsewhere. It is probably an iodin derivative of hydroxyquinolin. In our opinion its efficacy owes nothing to the iodin radical. This substance is generally given orally in pill form in doses of ten to twenty grains (one to three pills) three times daily after meals. It often increases or causes dysentery. The author is not able to give the large dosage generally recommended. The course lasts about ten or twelve days and then may be lessened and given more or less continuously.

The substance may be given from ampoules subcutaneously or intravenously as emetin is administered. Aside from the iodin content it does

not manifest any toxic action. The pure sulphate of this product is usable with great benefit orally by duodenal and by rectal lavage in from 1:3000 up to 1:500. It is both noncorrosive and nontoxic, having a high disinfectant value.

Chaparro amargosa (bitter bush), one of the simarubaceae, has much value. The extract, fluid extract, and the decoctions of its bark are to be had. The extract in four grain pills is given best after meals. The fluid extract in thirty to sixty minims may be given in hot water three to five times daily. It is slightly constipating and tends to produce nausea from its severe bitterness. A good decoction is made by combining the bark, the rind of the pomegranate fruit, and gum acacia, of each an ounce to a quart of water. Boil down to one pint and drink the entire amount over a period of twelve hours. Repeat as often as desirable—one to three times weekly. It is very disagreeable but nontoxic and truly helpful, and often relieves stubborn dysentery.

Our results with *mercurochrome* have not encouraged us. Salivation occurs too readily to allow its general use.

SURGICAL TREATMENT

Having mentioned all the chief drugs at our disposal for treatment, we deem a few words about mechanical therapy necessary. In all cases having adhesions, tumors, malformations, diverticula, etc., proper surgery is often necessary. This diagnosis must be carefully worked out and concurred in by careful observation and consultation. Cecostomy, appendicostomy, and sigmoidostomy properly done save life, but entail much risk as to time of election. The thermal treatment of Rivas seems to offer much promise, but requires careful control.

The treatment of complications is but the application of all of the above principles and drugs as modified by general pathology. Dysentery, obstruction, malnutrition, abscess of the liver and the other viscera, epilepsy, hypoadrenia, avitaminosis, arthritis deformans and other metabolic insufficiencies, iritis, dermatitis, colitis, neuritis, and others will often be complicated by the additional load of protozoa. With our meager knowledge of the chemical stuff that cells have offered to them for metabolism, with our ignorance of protozoan chemistry, with such reactions as allergy still a mystery, we must continue to observe and to tabulate our findings, doing so with full appreciation that many of our interpretations will often be wrong. However, with even a small showing of success we shall be imbued with true courage to bear criticism, as we dare for humanity.

Since to the author belongs the credit for the original conception that arthritis of Ely's type 2 is closely associated with colitis of protozoan origin,[2] I desire to give a brief outline of the medical treatment concerned in its management.

If the case is heavily infested, having the usual symptoms of protozoiasis, it should be treated exactly as any other protozoan case. The chronic constipation is very frequently cared for by the use of calcresta capsules to which is added all the methods of colonic lavage at our command. The roentgenological proof of iliac or cecal stasis, chronic appendix, chronic colitis, diverticulitis, or adhesions about the colon, is very essential. Surgery to restore normal physiological function may be required.

In chronic cases where no protozoa are found but where their secondary effects are shown by the malfunction of the intestines, improper absorption of toxic bodies and the invasion of secondary bacteria, treatment must be more chronic and more mild. It is in these cases that the alterative drugs, vitamins, nutrition, and general hygiene are most productive of good. Their course is so chronic that it is difficult for patients to continue one regimen long enough to produce results. The use of emetin seems sometimes to increase the patient's general sensibilities. Any pain or discomfort is more keenly felt. Often they show such ill humor and lack of appreciation that one wonders that any physician can be so magnanimous or so stupid as to offer himself as a target for such complaints. Physicians taking these patients must either develop compassion and contriteness of heart or be driven to madness by what may seem a hopeless task.

In cases with pain, swelling, deformity, and even fixation, we have recently used emetin directly into and about these painful spots, deformities and so-called ankyloses. We inject one-third to one-sixth of a grain and, whenever possible, follow it with diathermy for dispersing the drug. This treatment may be given two or three times weekly. At the point of injection there is the usual redness and tenderness which disappears within from three to seven days. We can truly recommend this form of therapy.

It is an interesting observation that other protozoacides do not seem to exercise this beneficial action to such a marked degree. The percentage of good results in arthritis deformans is not flatteringly high by any method. This method of treatment does not supplant any other form of therapy and even may be used coincidentally with anything that is beneficial to the patient. It is a valuable adjunct in the treatment of arthritis of this type and gives an added hope to both the patient and the physician in a grateful percentage of these neglected and often hopeless cases.

SUMMARY

In summation, the essential points we desire to express are:

1. Diet is not curative. Nutrition and function are all-important.

2. The drugs of standard recognizable use are headed by ipecac and its derivatives, stovarsol, neoarsphenamin, bismuth, chaparro amargosa, quinin, yatren, anayodin, and similar derivatives.

3. These infestations are chronic, accompanying and probably causing many secondary troubles

2. "The Amoeba as the Cause of the Second Great Type of Arthritis," Ely, Leonard, et al (California State Medical Journal, February, 1922).

as arthritis deformans, neuritis, iritis, endocrine disfunction, dermatitis, etc.

4. Because of the patient's naturally lowered vitality, overtreatment is decried.

5. Treatment must be persistent and sometimes as chronic as the disease itself.

6. Clinically, results of treatment are very good.

We wish to thank Dr. E. L. Armstrong and other co-workers for their helpful suggestions in the preparation of this paper.

1930 Wilshire Boulevard.

DISCUSSION

HERBERT GUNN, M. D. (350 Post Street, San Francisco).—There has been some controversy for a number of years regarding the pathogenicity of some of the intestinal protozoa observed in man, but this is the most novel exposition of the subject that has come to my attention.

The formulation of a syndrome that is applicable alike to the formidable *E. histolytica* and the harmless *Trichomonas intestinalis* is quite unique. *Entameba histolytica* is accepted as a pathogenic organism and is known to produce very definite pathological lesions with symptoms usually referable to the intestinal tract.

Often there are symptoms of a more complex character impossible to explain by the known pathology, and it is possible that these are, as Doctor Barrows suggests, of protein origin.

Entameba coli is very generally considered to be a harmless ameba, and I believe, in a broad sense, this view is correct. It certainly never produces the serious symptoms seen in histolytica infections. I have seen a few patients suffering from mild intestinal disturbance or obscure symptoms referable to other parts who, after being cleared of an ameba coli infection, appeared to be improved. However, I have seen a much larger number of such patients show no benefit from the treatment when cleared of their ameba.

The other commonly found amebas—the *Endolimax nana* and *Iodameba butschlii* are quite generally considered harmless, and rightly so I believe.

Of the commonly encountered flagellates the *Giardia intestinalis,* or *Lamblia* as it was formerly called, has received the most attention and been most seriously accused of being pathogenic. The parasite is certainly a most formidable looking animal under the microscope, and it is very liable to impress the observer that it is dangerous.

I have carefully observed a number of carriers of these flagellates, some of them over a number of years, and I have yet to see the case where I could definitely ascribe symptoms to their presence.

The *Chilomastix mesnili* and the *Trichomonas intestinalis* are generally accepted as harmless.

Personally I have never seen symptoms that could definitely be shown to be produced by them.

There are several difficulties which complicate studies of the flagellates—first of which is due to the fact that the cysts of the *chilomastix* and *giardia* may appear but periodically, and the *trichomonas* being found only in a liquid stool. It becomes necessary, therefore, to carry on quite extensive examinations before being certain that the parasite is really gone. In the second place there is no drug that I know of that will clear the intestinal tract of any of the flagellates.

I quite agree with what Doctor Barrows states as to the efficiency of such drugs as emetin hydrochlorid, emetin bismuth iodid, stovarsol, neoarsphenamin, and anayodin, but only in amebic cases. In my experience none of these drugs have any effect on the flagellates, as far as their removal is concerned. I have used some of these drugs quite extensively in the treatment of amebiasis, but have never observed any specific effect on any of the flagellates which not infrequently were present.

❦

Q. O. GILBERT, M. D. (1904 Franklin Street, Oakland).—The section is favored in this paper by Doctor Barrows, who has had such an extensive experience in treating patients with protozoan infestations. There are many clinical manifestations observed in these patients which as yet require speculation to explain. We must exercise charity if we do not agree and give deference to those of larger experiences. When we have more physiological and chemical data relative to the disorders of the digestive functions in patients with these types of intrinsic colitis our viewpoints will materially change.

I would like to call attention to the gastro-intestinal hypermotility in patients having amebic colitis. Frequent observations have shown patients complaining of intestinal discomfort, "constipation" and mild "toxic" symptoms, where food is evacuated soon after the twelve-hour period, and often at twenty-four hours not sufficient barium remains in the large bowel to cast a definite shadow. This has been of sufficient importance to suggest that when it occurs the patient should have a stool examination; ameba are frequently found. Discussions of this sort should surely suggest that we have more stools examined by competent laboratory observers. Sometimes smears from a proctoscopic examination are positive when stool search is negative. Many patients thus examined might be made comfortable after they have not been cured by cholecystectomies and appendectomies, rectal ulcer treatments and hemorrhoid operations. We believe that ofttimes the gall bladder and the appendix become involved, due to the long-standing colitis, possibly through the portal circulation. Operations are necessary, but careful microscopic examinations are also necessary to obtain a more complete pathological picture.

Eosinophilia.—1. An eosinophilia of 5 per cent or more occurred in three hundred patients among 5500 general medical cases, all of whom had complete blood counts and stool examinations. The small number of dermatologic cases seen and the entire absence of scarlet fever patients prevent this series from being wholly representative. Cases of obvious blood diseases were excluded.

2. Of the three hundred cases of eosinophilia in this series, 10 per cent occurred in parasitic infestation; 13 per cent in rheumatic fever; 13 per cent in chronic pulmonary disease (chronic bronchitis, emphysema, asthma); 10 per cent in the chronic nephritis—general arteriosclerotic group. In fully 40 per cent the eosinophilia occurred in isolated cases of various conditions and had no diagnostic significance.

It is suggested from this series that eosinophilia may be a part of the phenomenon of allergy.—Irvine H. Page, M. D., *J. Laboratory and Clinical M.*

Dental Clinics of Greater New York.—In one district alone of Greater New York there are said to be 20,000 school children whose teeth have been examined but who are waiting for the needed dental care. The dental services available at moderate cost for children and adults in that city have been found to be inadequate, although the city boasts 516 dental chairs in actual use in 152 public and private clinics. One reason for this inadequacy is that the equipment has been used less than half the time because of lack of available funds to pay dentists. The New York Tuberculosis and Health Association is now recommending the full use of existing facilities, more clinics for the districts outside Manhattan where most of the present clinics are concentrated. and coördinated development of adequate dental-clinic facilities especially for children two to sixteen years of age.—*U. S. Department of Labor.*